

## SANITARY REMEDIES.

NATURE is the great sanitary reformer. She is continually ameliorating the condition of our race. Let us follow her dictates, and be free. It is not, however, so much my intention to dwell on sanitary evils as on sanitary remedies. And first, as to heating and ventilation: were these two single items adequately attended to, it would go far to alleviate a prodigious mass of discomfort and disease.

Houses are heated in most cases with open fires: occasionally by means of stoves, hot-water, or steam apparatus. I would propose, however, to substitute ventilating stoves or fire-places, inasmuch as they furnish us not merely with warm, but, at the same time, pure fresh air. Suppose we take a stove-grate, and arrange it so that the open air finds admission below, between the outside casing and the stove itself. This air thus heated escapes above, and pervades the apartment in every direction. Thermometer, or common valves, might be employed to regulate the draught, and the room would be both heated and ventilated, at once, by means of the open fire and heated air. In Flanders, these stove-grates sometimes combine a cooking apparatus; and it would be obviously practicable to add a hot chamber, very useful, in humble establishments, for drying or airing clothes. Arranged on the ventilating principle, stove-grates would prove invaluable in halls and passages; and while they diffused a warm, moist, genial atmosphere, would neutralize the chilling in-draught from doors and windows. In large abodes, a hot chamber surrounding a cockle or stove, could be placed in the basement story, and on the ventilating principle, would warm the passages throughout. It would be very possible, also, to lead tubes for hot-air direct therefrom to any given apartment. The hot chamber also, could be placed under the basement floor; superior, however, to the Roman hypocaust, by the introduction of pure fresh air. Hot chambers might be formed in connection with any kind of stove, from the stately porcelain of Dresden, to one of plain cast-iron. It would only need an interspace of some kind where the open air could be admitted, and when heated, let out again. A common kitchen fire would answer: hot-water and steam-pipes would also be obviously available.

Hot, foul air accumulates at the top of each apartment; all that is necessary is to let it escape. This, however is seldom done, whether in the lordly mansion or the humble hut. But foul air will not sufficiently escape unless more air supply its place. It has been already shown how pure, fresh, warm air is to be obtained. This should gain admission into every room, over and under the door, through holes in the skirting, and even in the floor itself; as well from behind the chamber grate, if so arranged. The apertures at the ceiling may be into the chimney funnel itself, or into a collateral funnel, built up with the smoke conduit, one from each apartment, and terminating in a space beneath the roof, whence it could have proper vent through cowls, or louvres, constructed for the purpose. If the smoke funnel were preferred, the opening might be directly through the chimney-breast; but in any case it would look more sightly if led from the centre of the room, by means of a proper conduit, plaster-bedded between the joists, or in a hollow beam, or simply a tube attached beneath the ceiling. Among other advantages, the centre of this ceiling would prove most convenient for the funnel of a ventilating lamp; but let there be an opening, and of sufficient dimensions. An Arnott's valve, or a simple metal or porcelain tube, may be let into, or built into the chimney-breast. From 6 to 12 inches, varying with the size and uses of the apartment, would probably prove dimensions adequate for the purpose. All rooms, houses, palaces, shops, workshops, schools, factories, gaols, churches, should be adequately warmed, and ventilated,—in winter, by means of ventilating-stoves and foul air ducts; in summer, by free admission, night and day (due precautions being taken), of the uncontaminated open air.

It is just as necessary, and desirable to light a house well as to heat and ventilate it. Animals of every description, human beings more especially, become at once deformed and diseased when long withdrawn from the vivifying

Influence of light. Government, in place of taxing windows, should, if anything, tax the absence of them. Houses should be so constructed as to let the light fall freely on, and permeate them in every direction.

Every human dwelling should be well provided with pure soft water, both hot and cold. In every sleeping-room there should be a bath, with the proper facilities for laying on and letting off the water. The hot-water tank might be beside the kitchen fire. If the walls of the tank were made double, and the interstices well stuffed with some non-conducting material, as pounded breeze or charcoal, the heat might be kept up both night and day. A tank might be indifferently constructed of wood, metal, slate, stone. A small steam-boiler built into one side the kitchen fire would quickly impart the requisite warmth. The water might be pumped up when needed, or otherwise laid on; in all cases, however, employing packed tubes for conveying it. I do not see why we should not obtain hot water from Artesian wells, not forgetting to employ packed tubes here also. The Artesian well at the Grenelle, in Paris, must lose a vast deal of its caloric from the absence of this precaution. It would prove, in my opinion, a good speculation were water companies to supply towns with hot water as well as cold. There is indeed no reason why the earth should not supply us with water hot as well as cold, any more, perhaps, than why mechanical attrition or compressed air should not keep us warm, the electric fluid light our streets and houses, convey our messages, set our clocks going, and possibly, also, perform some of our hard work.

But we must get rid of human excretions. Every dwelling should have the utmost facilities for purity and cleanliness. If water-closets be not sufficiently detached and ventilated, they poison the air of the habitations to which they are attached. A syphon valve appears to me to be much the best; and it would be desirable there should be a drip of solution of sulphate of iron, or chlorine and soda, or lime, by which stretch would be cheaply and efficiently allayed. Water-closet pipes should be packed so as to guard against the frost. House-drains of glass, porcelain, or galvanised iron, should conduct into the main sewer, of similar materials and arrangement, only larger pipes—say 4 inches for the house-drains, and 12 for the street. It is most undesirable that feculence should find admittance into an open sewer; disastrous consequences must follow. Close street-drains should deliver their contents into fire-brick reservoirs, based on concrete and bonded in asphalt. Gutta-percha tubes and couplings would permit the contents to be pumped out, and chlorine or copperas in solution thrown in. On the banks of rivers boats could be employed to convey the refuse; elsewhere tumbrils.

There should be culverts or tunnels under every thoroughfare constructed of brickwork laid in asphalt, and based on concrete. They should have a flagged way on one or both sides, and be lofty enough to permit a man to pass. These culverts would occupy little more space than what is required for the present absurd and filthy sewer; and would suffice to convey not only sullage, but gas and water pipes. Durable in construction, they would cost little for repairs; and electric-telegraph, gas, and water, companies would probably pay handsomely for their use. The rain-water might be conveyed in a granite gutter six inches deep, at the base of the culvert; as for the drain and water pipes, they could be laid on suitable supports, stone, or metal. When such culverts were connected with rivers, as the Thames, liable to rise of tide, proper valves would guard against the intrusion of the waters.

Streets, lanes, alleys, courts, should be daily swept, and the filth at once removed: wire-web gratings, placed in syphon valves, would prevent the refuse gaining admission into the rain conduits. Roadways, streets, should be laid with lines of granite curb, say a foot over, and ten feet long, of which the four sides should be made to turn up in succession; the whole on a good thick bed of concrete. I would have a pair of these granite ways, one on each side of the street or road; the interspaces being of coarse gravel, laid in asphalt. Such an arrangement would probably last as

long as the Appian way itself. It would be really cheap of construction considering its durability, the easy traction it would afford, the comparative exemption from dust, and saving of horse-power; advantages to which roads laid down on the system of McAdam cannot for a moment lay claim.

Human abodes should be invariably placed above the level of the soil; in Genoa and other Italian towns, many people it is said, will not consent to live on the ground-floor. At any rate, all direct communication should be cut off by asphalt or plaster of Paris on a concrete base. Houses, even the meanest, could be readily isolated, either at the time of their construction or afterwards. It is wrong to lay the joists of houses, were it the very poorest, directly over the soil, thus affording immediate admission to damp, stench, vermin. When asphalt ground-floors are employed, it will be requisite to place a flag at the fire-place. Asphalt is vastly better, at least in these cold regions, than stone, in basement floors. Our chill, and sometimes damp walls also, were better if covered with panelling, rendered fire proof, than left naked or decked with paper hangings, mere shreds.

Interments, whether in or out of towns, unless some fifteen feet deep, should be prohibited. I do not think public feeling in these countries would sanction casting the dead into pits, one for every day in the year, as practised at Naples, any more than raising a pyramid of human remains, or casting them into the sea.

Any of these, however, would be far preferable to the present mode of burial. The sacred relics of humanity would no longer incur exposure, nor would the necessary processes of decomposition come into revolting proximity with animated existence. The whole difficulty in this important matter may, I conceive, be got rid of, by abandoning, at once and for ever, the practice of superficial interment. The Egyptians knew the secret some four thousand years ago, and we still con the lesson they have taught us in vain. In a word, I would construct receptacles of suitably large dimensions, covered or uncovered, in the soil, and lay the dead by thousands or tens of thousands in cavities, covering up each layer with fluid asphalt. These cities of the dead should be accessible to the public: they might be adorned with Doric columns; if underground, lighted and ventilated, with separate mausolea for those who wished it and chose to pay. As for the poor, they should be buried gratuitously. I can see no possible objection to this arrangement; it invades no religious or social prejudice; it secures the desired objects in the fullest sense of the words, while every rite that can bring comfort to the hearts of afflicted survivors could be fully attended to. Deserted quarries, as has, indeed, been done in Liverpool, might be rendered available; abandoned mines, also desert-tracks and mountain slopes, Dartmoor, Lancashire, or Cornwall, thanks to railways, would be readily accessible from London say, and the remains might be nightly or daily forwarded from any town, large or small, to their respective destinations. It might be for the railway interest to stir in this business; and it would certainly be for the interests of every one, that the present revolting, unhealthy, insufficient, and scandalous modes of interment were wholly discontinued.

Cholera, plague, fever, after all, are species of poisoning, almost if not entirely as much within human control, as poisoning by arsenic or corrosive sublimate. Preventive measures are just as efficient in one case as in the other. If the opinion of one who has paid this subject long and anxious consideration be of any weight, I would utter it as my most sincere conviction that the above-named diseases would have no power whatever over a community whose sanitary welfare was even tolerably provided for. The rich will look to themselves, but the poor and ignorant must be minded; they neither know nor care to look to themselves. Their dwellings should be entirely reconstructed: they are every where, at least as regards these kingdoms, a disgrace to civilization—nay, to common decency. I can speak from experience. I have been in the huts of the Africans, of the American Indians; I never saw the filth, the desolating, appalling, wretchedness that I have over and over witnessed in England, Ireland, Scotland. It would be a glorious aim for the noble profession of